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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Takaaki Hirai

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EXAMINER

CHANG, VICTOR S

ART UNIT

PAPER NUMBER

1771

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/22/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

09/856,468

Applicant(s)

HIRAI ET AL.

Examiner

Victor S. Chang

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-8 and 10-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-8 and 10-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Introduction***

1. Applicants' amendments and remarks filed on 12/29/2006 have been entered. Claim 1 has been amended. Claims 1, 3-8 and 10-20 are active.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Since newly amended ranges of crystallinity, crystallization peak temperature, and amount of moiety derived from isophthalic acid or 1,4-cyclohexanedimethanol in claim 1 are commensurate with the provided support in the specification, the 112, 1<sup>st</sup> paragraph rejection over new matter in the previous Office action is withdrawn.

### ***Rejections Based on Prior Art***

4. Claims 1, 3-8 and 10-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 08-174590 [machine translation] in view of Park [US 5475037].

JP '590 [abstract; paragraphs 0008, 0015 and 0018] relates to preparing pre-expanded particles of a thermoplastic polyester resin and bonding (molding) together pre-expanded particles to form an expanded (foamed) material with a bulk density of 0.02-0.7 g/cm<sup>3</sup>. The pre-expanded particles are prepared by melt extruding the thermoplastic polyester resin and a foaming agent, followed by cutting. The polyester resin is made by reacting dihydric alcohol with dicarboxylic acid. Suitable monomers include terephthalic acid, isophthalic acid (IPA) and cyclohexanedimethanol (CHDM), etc. The crystallinity of 25% or less in the pre-expanded

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particles is maintained. JP '590 teaches that a reduced crystallinity in the pre-expanded particles is required for obtaining a good weld (fusion) between the particles during molding. In Example, the pre-expanded particles have bulk density of  $0.2 \text{ g/cm}^3$  and crystallinity of 10%.

For claims 1 and 4, the ranges of crystallinity and bulk density of the pre-expanded particles taught by JP '590 read on the instant invention as claimed. JP '590 is silent about the monomer ratio and crystallization peak temperature of the polyester resin. However, regarding the monomer ratio, Park's invention [abstract; col. 2, line 40 through col. 3, line 16] relates to a low density foam of amorphous polyethylene terephthalate copolymer. Park teaches that while typical polyethylene terephthalate (PET) resin has a crystallization half-time less than 10 second, an amorphous PET either does not crystallize or crystallizes very slowly, such as having a crystallization half-time longer than about one hour. The amorphous polyester resins may be produced by introducing irregularity in the polymer chains such as by including a plurality of diacids, diols, or both, such as isophthalic acid, cyclohexanedimethanol, or both, in the monomer mixture. Generally, amorphous polyesters are produced by the incorporation of relatively large amounts (about 15% to about 50%) of isophthalic acid or cyclohexanedimethanol or both in the polyester chain structure. In view of Park's teaching that isophthalic acid and/or cyclohexanedimethanol commoners reduce the crystallinity of polyester and render the polyester resin crystallizes very slowly, it would have been obvious to one skilled in the art of polyester foams to select a polyester resin of low crystallinity, produced by incorporating a suitable small amount of isophthalic acid and/or cyclohexanedimethanol co-monomers, to make the polyester of JP '590, motivated by the desire to obtain pre-expanded foam particles with a reduced crystallinity of 25% or less for an improved fusion between the particles during molding.

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Regarding the crystallization peak temperature, since applicants have admitted that “The crystallization peak temperature is a function of the materials” [see Appeal Brief filed 11/4/2004, page 11, top paragraph], the crystallization peak temperature is believed to be either an inherent material property or obviously provided, once a suitable copolyester composition with reduced crystallinity is selected, as set forth above.

For claim 3, incorporating a suitable small amount of polytetrafluoroethylene particulates as a foam nucleating agent is old and well known (the previous Official notice is now taken as admitted prior art).

For claim 5, JP ‘590 teaches that the various foam particle shapes, including rod-like (strand), can be made [paragraphs 0006 and 0007].

For claim 6, the melt tension of the polyester resin is also believed to be either an inherent material property or obviously provided, once a suitable polyester composition with reduced crystallinity is selected, as set forth above.

For claim 7, a workable open cell ratio in the range is considered to be either inherent or an obvious routine optimization, once the same polyester composition is selected, foamed by the same process, and for the same end use.

For claim 8, JP ‘590 teaches that it is a common practice to carry out a post expansion of the pre-expanded particles by pressure treatment [paragraph 0013].

For claim 10, JP ‘590 teaches that a polyester foam molding is obtained by filling up a metal mold with pre-expanded foam particles, carry out further heat expansion [paragraph 0002].

For claim 11, JP ‘590 teaches that the bulk density of a molded foam is 0.02-0.7 g/cm<sup>3</sup>. As to the fusion ratio, since the combined teachings of prior art render the generally conditions

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of the instant invention obvious, a suitable range of fusion ratio is considered to be an obvious routine optimization to one skilled in the art foam molding, motivated by the desire to obtain a well fused molded foam article.

For claims 12 and 13, molding a foamed article with a layer of film or sheet as a skin layer is old and well known (the previous Official notice is now taken as admitted prior art). Further, since the combined teachings of prior art render the generally conditions of the instant invention obvious, a suitable amount peel strength between the foam core and the skin layer is considered to be an obvious routine optimization, motivated by the desire to obtain a durable molded composite foam article.

For the product-by-process claims 14 and 20, since the process limitation has not been shown on the record to produce a patentably distinct article, the formed articles are rendered *prima facie* obvious, and this limitation at the present time has not been given patentable weight.

For claims 15-19, since they claim the same scope as claims 3, 5, 6, 8, 11 and 14, they are also rejected as set forth above.

### ***Response to Argument***

5. Applicants argue at Remarks page 6 that the amended ranges are sufficient to overcome the *prima facie* case of obviousness, because the experimental data have shown that these ranges are critical to achieve unexpected results over the prior art ranges, such as Examples 9 and 15 shows that the claimed crystallinity range improves the fusion ratio of prepuffs and provides excellent appearance and heat resistance; and Examples 4, 5, 9 and 10 shows that the claimed crystallization peak temperature of a polyester with IPA or CHDM co-monomer in the claimed

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range also improves the fusion ratio and provides excellent appearance and heat resistance. However, since the combined teachings of prior art render the claimed amount of polyester crystallinity reduction co-monomers obvious, motivated by the desire to obtain pre-expanded foam particles with a reduced crystallinity of 25% or less for an improved fusion between the particles during molding, it is unseen how the claimed ranges are distinguished over the teachings over prior art. Further, since the prior art teaches an improved fusion between particles by reduced crystallinity, and crystallization peak temperature is merely an inherent material property of pre-expanded foam particles with reduced crystallinity, the excellent appearance and heat resistance in the Examples appear to be expected results, not unexpected.

### *Conclusion*

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

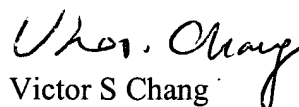
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor S. Chang whose telephone number is 571-272-1474. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel H. Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Victor S Chang  
Examiner  
Art Unit 1771

2/7/2007